

**IN THE CLAIMS:**

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Previously Presented) A method comprising:

modeling a circadian rhythm having a first sinusoidal curve with a 24 hour period and a second sinusoidal curve with a 12 hour period using a processor,

calculating a cognitive level of a person using a processor based on the person's sleep/wake data received from an actigraph or a polysomnography system,

calculating a predicted cognitive performance based on said circadian rhythm and said cognitive level using a processor.

2. (Currently Amended) A system comprising:

at least one input device for receiving sleep/wake data,

a microprocessor including

means for modeling a circadian rhythm,

means for determining a cognitive level of a person based on the person's sleep/wake data at predetermined fixed intervals having an identical time period, and

means for calculating a predicted cognitive performance in response to said determination of said cognitive level based on said circadian rhythm and said cognitive level, and

a display to show the predicted cognitive performance.

3. (Currently Amended) A ~~computer-readable~~ medium having ~~computer-executable instructions~~ computer program product for predicting a cognitive

performance level of an individual, the ~~computer-executable instructions~~ computer program product comprising:

first program ~~instruction means for modeling~~ instructions to model a circadian rhythm,

second program ~~instruction means for determining~~ instructions to determine a cognitive level of a person based on the person's sleep/wake data that includes a series of epochs where each epoch is classified as sleep or wake, and

third program ~~instruction means for calculating~~ Instructions to calculate a predicted cognitive performance for each epoch of data based on said circadian rhythm and said cognitive level.

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34. (Cancelled)

35. (Previously Presented) A method for providing a cognitive performance level comprising:

receiving a data series representing at least one wake state and at least one sleep state an actigraph or a polysomnography system,

selecting a function based on the data series, wherein the function is selected from a group consisting of a wake function, a sleep function, and a sleep inertia function, where

the wake function is expressed as follows

$$w(t) = C_{t-1} - k_w$$

where  $k_w$  is a positive function,

the sleep function is expressed as follows

$$s(t) = C_{t-1} + (100 - C_{t-1}) / k_s$$

where  $k_S$  is a time constant, and

the sleep inertia function is expressed as follows

$$i(t) = C_{SW} * [0.75 + 0.025(t - t_{LS}) - (0.025(t - t_{LS}))^2]$$

where  $t_{LS}$  is time when the last sleep state occurred and  $C_{SW}$  is the cognitive level at the last sleep state,

determining a cognitive performance capacity using the selected function using a processor,

modulating the cognitive performance capacity with a time of day value using a processor, and

providing the modulated value.

36. (Cancelled)

37. (Previously Presented) The system according to claim 2, wherein said input device is in communication with an actigraph.

38. (Previously Presented) The system according to claim 2, wherein said input device is in communication with a polysomnography system.

39. (Currently Amended) A The system according to claim 2, comprising:  
at least one input device for receiving sleep/wake data, wherein said sleep/wake data contains a series of epochs where each epoch is classified as sleep or wake,  
a microprocessor including  
means for modeling a circadian rhythm,  
means for determining a cognitive level of a person based on the person's sleep/wake data, and

means for calculating a predicted cognitive performance based on said circadian rhythm and said cognitive level, and  
a display to show the predicted cognitive performance.

40. (Currently Amended) ~~A~~ ~~The system according to claim 2, comprising:~~  
at least one input device for receiving sleep/wake data,  
a microprocessor including

means for modeling a circadian rhythm, wherein the circadian rhythm has a first sinusoidal curve with a 24 hour period and a second sinusoidal curve with a 12 hour period,

means for determining a cognitive level of a person based on the person's sleep/wake data, and

means for calculating a predicted cognitive performance based on said circadian rhythm and said cognitive level, and  
a display to show the predicted cognitive performance.

41. (Currently Amended) ~~A~~ ~~The system according to claim 2, comprising:~~  
at least one input device for receiving sleep/wake data, wherein the person's sleep/wake data includes a series of epochs where each epoch is classified as sleep or wake,

a microprocessor including  
means for modeling a circadian rhythm,  
means for determining a cognitive level of a person based on the person's sleep/wake data, and

means for calculating a predicted cognitive performance based on said circadian rhythm and said cognitive level, said means for calculating the predicted cognitive performance performs the calculation for each epoch of data.

42. (Currently Amended) The ~~computer-readable-medium~~ computer program product according to claim 3, wherein the circadian rhythm has a first sinusoidal curve with a 24 hour period and a second sinusoidal curve with a 12 hour period.

43. (Cancelled)

44. (Previously Presented) The method according to claim 1, wherein said sleep/wake data contains a series of epochs where each epoch is classified as sleep or wake.

45. (New) A method comprising:

calculating a cognitive level of a person using a processor based on the person's sleep/wake data received from an actigraph or a polysomnography system,

retrieving from memory a time of day value for a time of day that the calculated cognitive level is being calculated for, where the time of day value is from a data series of time of day values that together approximate a curve having a first curve component having a 24 hour period and a second curve component having a 12 hour period,

calculating a predicted cognitive performance using a processor based on said retrieved time of day value and said cognitive level, and

displaying said calculated predicted cognitive performance.

46. (New) The system according to claim 41, further comprising a display to show the predicted cognitive performance.